

# Master Plan Approach

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**In every walk with nature one receives far more than he seeks.**

**~ John Muir**

Items presented here will serve as a general guide for the creation of a *Pedestrian and Bicycle Master Plan* for the City of Clearwater. This guide contains a general project overview supported by the presentation of the technical approach for each task that will be used in the development of the Master Plan. While these items are presented in this guide, please note

that the planning process will require flexibility to ensure that the creation of the Master Plan responds to the public and agency participants.

This *Pedestrian and Bicycle Master Plan* is a comprehensive plan that provides a framework to further improve the walking and bicycling environment in the City of Clearwater. The Master Plan will assess facility needs, past planning documents, collision statistics, and present education and safety programs, in addition to various policies intended to further improve the safety, convenience and frequency of walking and cycling in our community.

The Master Plan process will include community involvement activities as well as technical and policy analysis, to identify needed and feasible programs and projects. Community involvement activities are presented in the Community Involvement Plan, which is included as a separate section in the Master Plan.

## **General Overview**

The Master Plan development is divided into several tasks and activities. This section presents a sequence of key steps in the planning process, providing a context for the general approach and Community Involvement Plan, while demonstrating how the technical analysis and public participation methods are integrated.

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## **Task 1: Project Initiation**

- Prepare detailed schedule and program
- Prepare draft Community Involvement Plan
- Prepare draft Project Approach
- Prepare draft Master Plan Outline
- Initiate data collection
- Prepare draft Goals and Objectives

## **Task 2: Existing Conditions Inventory and Analysis**

- Review all relevant planning documents for bicycle/pedestrian elements
- Assess current walking/cycling rates
- Perform crash data analysis
- Establish current roadway walking/cycling conditions through Level of Service Analysis
- Identify current roadway route network
- Assess trail opportunities
- Inventory current cycling/pedestrian safety programs
- Inventory current mode shift programs
- Inventory current transit access

## **Task 3: Determine Walking and Bicycling Needs**

- Identify cycling and walking demand
- Identify infrastructure needs/gaps
- Survey "best practices" for program and policy needs

## **Community Open House Workshop**

- Present benefits of walking and cycling and survey
- Present existing conditions analysis
- Determine community infrastructure demand using maps

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## **Task 4: Develop Implementation Plan**

- Determine facility cost by type
- Develop list of prioritized infrastructure projects
- Develop policy and program recommendations supporting goals and objectives
- Present funding alternatives
- Create draft Master Plan

## Community Draft Plan Presentation

- Present draft plan

## **Task 5: Final Master Plan Preparation**

- Final Master Plan text

## **Task 6: Master Plan Approval**

- Presentation to Parks and Recreation Board
- Presentation to Community Development Board
- Presentation to the ADA Advisory Committee
- Presentation to City Council

## **Technical Approach**

This section presents the proposed technical approach to fulfill the above tasks. This methodology is intended to provide details on approach methods, convey the sequence of activities and identify project milestones for task completion. It should, however, be recognized that every detail of the approach cannot be specified at this time. As the Master Plan evolves, other methods may be applied.

## **Task 1: Project Initiation**

As part of the initial project preparation, a number of tasks will be completed. The tasks include development and initial implementation of a Community Involvement Program, preparation of the project approach (this guide), preparation of draft goals and

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objectives, development of a project schedule, and initial data collection. Key tasks of this initial preparation are described below in further detail.

## Community Involvement Plan

The proposed Community Involvement Plan presents the methods and activities by which the community will be involved in the creation and adoption of the Master Plan. Community input, staff participation, and technical activities will be integrated to provide the qualitative and quantitative analysis of needed bicycle and pedestrian projects and programs. These activities will occur throughout the planning process. To include both community and staff members, it is proposed to have two simultaneous committees: a Pedestrian and Bicycle Master Plan Task Force and a Staff Steering Committee. These committees will be established to facilitate participation and input in the development of the plan.

The proposed Community Involvement Plan for the project is presented as a section in the Master Plan.

## Draft Goals and Objectives

Goals and Objectives will be drafted during the initial preparation to begin discussions with the Pedestrian and Bicycle Master Plan Task Force and the Staff Steering Committee to help guide the work tasks and the organization of the Master Plan.

## Initial Data Collection

Initial data collection will begin in order to expedite the work tasks in the Existing Condition Analysis as described below. This shall include inventory of present plans, policies and programs as well as existing on-road conditions and trail opportunities.

## **Task 2: Existing Conditions Inventory and Analysis**

This task will describe the current state of bicycling and walking in the City of Clearwater, and will serve as the foundation for identifying needed facilities and strategies in the Master Plan. Key components within the inventory and analysis include a review of existing plans and programs, inventory of current trail opportunities,

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evaluation of current roadway conditions for bicycling and walking, inventory of transit access, current safety programs and mode shift programs, and collision data analysis. Each of these components are described in the following sections:

## Existing Plans and Programs

This will be an important part of the early work effort because it provides a clear understanding of the existing policy framework. Because the Master Plan is intended to be a comprehensive document with a citywide perspective, plans and programs to be reviewed include those that address transportation, land use planning and parks and recreation.

## Current Trail Opportunities

Through the Bikeways and Trails Plan, the City of Clearwater has been actively implementing many trail projects. Existing and proposed trails will be identified as part of this task.

## Current Roadway Conditions for Bicycling and Walking

To identify the current roadway conditions of bicycling and walking, both bicycling and pedestrian Level of Service Analysis will be performed for arterial and collector roadways in the City. This analysis will provide a baseline condition from which new facility and strategy recommendations will be developed.

## Bicycle Level of Service

Bicycle level of service (BLOS) is an accepted method for quantifying the adequacy of existing roadway facilities for cycling. While not the sole component of the approach for describing existing bicycling conditions, it does provide an important, objective perspective.

The Bicycle Level of Service Model was developed in 1996 and has been applied to over 200,000 miles of roadway throughout the United States and has been adopted by the Florida Department of Transportation as reflected in their 2002 Quality of Service Handbook. The model is a statistically-reliable method of evaluating the bicycling

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conditions of shared roadway environments. It utilizes the same traffic and roadway factors that transportation planners and engineers use for other travel modes. “The bicycle level of service for each roadway segment is based on five variables with relative importance (T statistic) ordered in the following list:

- average effective width of the outside through lane,
- motorized vehicle volumes,
- motorized vehicle speeds,
- heavy vehicle (truck) volumes, and
- pavement condition.

Average effective width is largely determined by the width of the outside travel lane and striping for bicyclists, but also includes other factors such as the effects of street parking and drainage grates. Each of the variables is weighted by

coefficients derived by stepwise regression modeling importance. A numerical LOS score, generally ranging from 0.5 to 6.5, is determined and stratified to a LOS letter grade. Thus, unlike the determination of automobile LOS in the Highway Capacity Manual 2000, in which there is usually only one service measure (e.g., average travel

$$\text{Bicycle Level of Service Score} = 0.507 \ln(\text{Vol15/L}) + 0.199 \text{SPt}(1+10.38\text{HV})^2 + 7.066(1/\text{PR5})^2 - 0.005(\text{We})^2 + 0.760$$

Where:

BLOS = Bicycle level of service score

ln = Natural log

Vol15 = Volume of directional motorized vehicles in the peak 15 minute time period

L = Total number of directional through lanes

SPt = Effective speed factor =  $1.1199 \ln(\text{SPp} - 20) + 0.8103$

SPp = Posted speed limit (a surrogate for average running speed)

HV = percentage of heavy vehicles

PR5 = FHWA's five point pavement surface condition rating

We = Average effective width of outside through lane

Where:

We = Wv - (10ft x %OSP) Where W1 = 0

We = Wv + W1(1 - 2x %OSP) Where W1 > 0 & Wps = 0

We = Wv + W1 - 2 (10 x %OSP) Where W1 > 0 & Wps > 0 and a bicycle lane exists

Where:

Wt = total width of outside lane (and shoulder) pavement

%OSP= percentage of segment with occupied on-street parking

W1= width of paving between the outside lane stripe and the edge of pavement

Wps = width of pavement striped for on-street parking

Wv = Effective width as a function of traffic volume

Where:

Wv = Wt if AADT > 4,000 veh/day

Wv = Wt(2-(0.00025 x AADT)) if AADT < 4,000 veh/day, and if the street/road is undivided and striped

Exhibit A-1: Bicycle Level of Service

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Exhibit 2 Level of Service Categories	
Level of Service	Score
A	<1.5
B	>1.5 and <2.5
C	>2.5 and <3.5
D	>3.5 and <4.5
E	>4.5 and <5.5
F	>5.5

Department of Transportation. The pedestrian LOS measures the safety and comfort of pedestrians in the roadway or nearby roadside environment: either along the roadway lanes, on a sidewalk or nearby shared use path, or on a nearby exclusive pedestrian facility. “In the Pedestrian LOS Model, pedestrian levels of service are based on four variables with relative importance (T statistic) ordered in the following list:

- existence of a sidewalk,
- lateral separation of pedestrians from motorized vehicles,
- motorized vehicle volumes, and
- motorized vehicle speeds.

Each of the variables is weighted by relative importance (determined by

speed), bicycle LOS is determined based on multiple factors.”<sup>1</sup> In the Bicycle LOS Model, bicycle levels of service are determined using the equation presented in Exhibit 1 and then applying the level of service thresholds (Exhibit 2) to the calculated scores.

## Pedestrian Level of Service

To evaluate the walking conditions in our roadway network, a pedestrian level of service model (see Exhibit 3) was developed by the Florida

### Pedestrian Level of Service Score =

$$-1.2276 \ln (Wol + Wl + fp \times \%OSP + fb \times Wb + fsw \times Ws) + 0.0091 (Vol15/L) + 0.0004 SPD^2 + 6.0468$$

Where:

PLOS = Pedestrian level of service score

ln = Natural log

Wol = Width of outside lane

Wl = Width of shoulder or bicycle lane

fp = On-street parking effect coefficient (=0.20)

%OSP = Percent of segment with on-street parking

fb = Buffer area barrier coefficient (=5.37 for trees spaced 20 feet on center)

Wb = Buffer width (distance between edge of pavement and sidewalk, feet)

fsw = Sidewalk presence coefficient (= 6 – 0.3Ws)

Ws = Width of sidewalk

Vol15 = Volume of motorized vehicles in the peak 15 minute period

L = Total number of directional through lanes

SPD = Average running speed of motorized vehicles traffic (mi/hr)

Exhibit A-3: Pedestrian Level of Service

<sup>1</sup> Florida Department of Transportation, “2002 Quality of Service Handbook”, 2002.



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stepwise regression modeling): A numerical LOS score, generally ranging from 0.5 to 6.5, is determined along with the corresponding LOS letter grade. Thus, like the bicycle LOS approach, pedestrian LOS is determined based on multiple factors.

Researchers developing the Pedestrian LOS Model, under contract with FDOT, conducted step-wise regression analyses using 1315 real-time observations from a research effort conducted in 2000 in Pensacola. In the Pedestrian LOS Model, pedestrian levels of service are determined using the equation and then applying level of service thresholds (see Exhibit 2) to the calculated scores.

Many of the terms in the Pedestrian LOS Model equation are also used to determine automobile LOS in the Highway Capacity Manual methodology and in the Bicycle LOS Model.”<sup>2</sup>

## Field Review

A field review will be performed to collect the necessary data. Both the Bicycle and Pedestrian LOS results will be used as a screening tool to identify potential trouble spots and document existing conditions. It will not be used solely to dictate strategies, but will provide initial insight into possible improvements.

## Collision Data Analysis

Collisions from the past five years will be displayed on a map and evaluated for a variety of crash types. Collisions will be evaluated by type to determine such factors as alcohol impairment, lighting, failure to yield the right-of-way, etc. This data will be used to determine the location of collision hot spots within the City of Clearwater.

## Program Inventory

Initial inventory will be conducted during this phase and will focus on current safety programs and mode shift programs that are offered in the City by different organizations. This data will be used as a baseline to compare national best practices in these arenas.

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<sup>2</sup> Florida Department of Transportation, “2002 Quality of Service Handbook”, 2002.



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## Access to Transit

Because transit accessibility and a pedestrian (and bicycle) friendly environment are closely linked, an important component of the existing conditions inventory will be an analysis of bicycle and pedestrian access to the transit system. Areas that are currently served by transit or where transit service is planned will be analyzed using the Bicycle and Pedestrian Level of Service Models to determine if the surrounding environment is conducive to walking and biking.

### **Task 3: Determine Bicycling and Walking Needs**

While an analysis of bicycling and walking conditions can produce information regarding existing facilities and current programs and policies, an evaluation of present infrastructure gaps combined with an analysis of existing and future demand, is also necessary to determine the facilities and areas in most critical need of attention.

The Existing Conditions Analysis will serve as the base to identify citywide bicycling and walking infrastructure needs. This will be combined with an estimate of demand to determine the facilities that are in need of modification. The emphasis here will be to identify critical relationships between origins and destinations in the built environment where new facilities, policies and other strategies will enhance and encourage bicycle and pedestrian travel.

## Walking and Bicycling Demand

Determining demand will consist of a quantitative and qualitative approach to identify key origins, destinations and travel patterns. This will be determined through analysis of present land use, while incorporating the results of the community workshops. The community workshop is the point where the needs of the community will be expressed.

## Best Practices Survey

In order to prepare for the next task, the Implementation Plan, it will be necessary to inventory best practices that target safety and mode shift programs in other municipalities throughout the United States. This will assist in safety and mode shift program recommendation for the City of Clearwater.

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## Task 4: Implementation Plan

The Implementation Plan is the stage where the project truly comes together. With this task, we will establish a blueprint for bicycling and walking as an integral part of the City of Clearwater. The Implementation Plan will convey a systematic approach to improving non-motorized transportation mobility and safety through development of facilities and programs. The plan will include two primary parts:

- infrastructure modification priority list(s) for roadway segments and trails, and
- strategies to strengthen and enhance our environment for walking and bicycling

Strategies will include both programs and policies that support use of and further development of those facilities.

### Infrastructure Priority Lists

After the needs are defined, this part of the Implementation Plan will develop a list of priority roadway segments for modification. A cost-benefit index is proposed to establish for segment prioritization. Benefit-Cost indices are tools that are used in infrastructure investment planning and programming. They compare the “benefit” gained from the modification of a facility against its cost. They also provide an indication of the relative value of improving a transportation facility with respect to other similar proposed transportation facilities.

The prioritization process described below anticipates that three independent prioritization lists will be generated. The first list will be for bicycle facilities, the second list will be for pedestrian facilities, while the third will identify future trail projects. The lists have been separated, as each may have an independent funding source or sources.

The individual terms (and their weighting) of the Benefit-Cost factor are the ranking evaluation tools that will be determined in the Task Force and Staff Steering Committee meetings. Those recommended for the numerator or “benefits” will include earlier existing analysis results such as the results of the bicycle and pedestrian level of service analysis, results of community’s input regarding demand, and number of collisions on the segment. The denominator will reflect the actual project “cost”.

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Thus, the Benefit-Cost Index could be:

$$\frac{a_1 \times \text{LOS} + a_2 \times \text{Demand} + a_3 \times \text{Public Input} + a_4 \times \text{Crash}}{\text{Cost}}$$

and  $a_1$  through  $a_4$  are potential weighting for each item in the numerator.

This prioritization lists resulting from the cost-benefit index calculation represent the final ranking, but not necessarily the construction order/schedule that facilities will be programmed for improvements. This final needs ranking provides an objective basis to select and schedule roadway segment projects.

## Strategies

A comprehensive bicycle and pedestrian master plan is more than just a summation of needed facilities and the cost for their construction. The *Pedestrian and Bicycle Master Plan* must also provide guidance about how a variety of complementary strategies should be developed or enhanced for walking and bicycling. Strategies will relate to programs and policies that support use and further development of those facilities.

## Task 5: Final Master Plan Preparation

The draft plan will be presented to the community through a workshop in an effort to obtain final comment. After this workshop, the final master plan will be prepared.

## Task 6: Master Plan Approval

The final plan will be presented at several committees for their review and approval. The committees include the:

- Community Development Board
- ADA Advisory Committee
- Parks and Recreation Board

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After the final plan receives approval from the above committees, the City of Clearwater's *Pedestrian and Bicycle Master Plan* will be forwarded to the City Council for their review and approval.

## **Conclusion**

The implementation of the proposed technical approach and Community Involvement Plan will provide the foundation for the City's *Pedestrian and Bicycle Master Plan*. This plan's process is comprehensive and will evaluate existing conditions, estimate demand and propose appropriate implementation elements.